REMARKS

Claims 1-20 are pending in the application. Claims 12-20 are withdrawn from consideration. Claim 1 and 14 are independent claims.

By this Office Action, the Examiner has required restriction to one of the following inventions under 35 U.S.C. § 121:

Group I – Species A: Claims 1-11, drawn to a Ridge-type Gain-Clamped SOA (FIG. 2).

Group I – Species B: Claims 12-13, drawn to a buried Heterostructure Gain-Clamped SOA (FIG. 5).

In response to the Requirement Restriction, applicant provisionally elects to prosecute the invention of Group I – Species A, with traverse claims 1-11, drawn to a Ridge-type Gain-Clamped SOA (FIG. 2). In the process, applicant provisionally withdraws claims 12 and 13, and provides remarks on claims 1-11.

Claims 21-29 have been added. The support for claim 21 can be found Figure 2, which shows light amplification direction (A) being perpendicular to the horizontal lasing direction (B). Support for claim 22 can be found at page 7, line 15-18. Support for claims 23 and 24 can be found at page 8, line 3-7, which indicates that the passive layer provides an optical confinement between the Bragg lattice and the gain layer and has a refractive index greater than that of the semiconductor substrate.

The support for claims 25 and 26 can be found at page 8, line 22 – page 9, line 6, where the phase conversion electrode is disclosed to supply a non-uniform current to the phase conversion area and that the phase conversion electrode controls the lasing wavelength. By controlling the lasing wavelength, the present semiconductor optical device is capable amplifying an input signal without a need for a wavelength filter that removes an oscillation

wavelength of the semiconductor optical amplifier, as recited in claim 27 (compare page 4, line 3-5 and page 8, line 21 – page 9, line 6).

The support for claim 28 can be found at page 9, line 10-17. Furthermore, support for claim 29 can be found at page 16, line 2-5.

Applicant wishes to thank the Examiner for indicating that claims 2-11 are allowable if the claims are rewritten as independent claims incorporating all features of the base and any intervening claims. Applicant, however, wishes to defer rewriting the claims 2-11.

Claim 1 stands rejected under 35 U.S.C. ' 102(b) as allegedly being anticipated by Ono *et al.* (J.P. Pub. 04285919) ("Ono"). Claim 1, as written, recite, *inter alia*, "a semiconductor optical amplifier... for generating a laser oscillation in a horizontal direction and amplifying a light input to the semiconductor optical amplifier in a length direction, **wherein the length direction is in a non-parallel relationship with the horizontal direction**."

The specification notes that by amplifying the signal in a direction that is not parallel to the lasing direction, the present semiconductor optical device is capable of eliminating the four wave mixing (page 4, line 20 – page 5, line 1) attributable to having the signal amplified in the same direction as the laser beam oscillation (page 3, line 21 – page 4, line 5).

In rejecting claim 1, the Office Action indicates that the semiconductor (1), a wave-path (1a), and waveguide (1b), collectively, disclose a semiconductor optical amplifier having a horizontal-direction lasing structure, as recited in claim 1 (present Office Action, page 3, line 7-10). As such, the Office Action indicates that the semiconductor optical amplifier does not patentably distinguish claim 1 from Ono.

Ono, as read by applicant, discloses optical amplifying circuit. However, nowhere in Ono is there a disclosure that any one of its semiconductor amplifier (1), the wave-path (1a), and

the waveguide (1b) has a horizontal-direction lasing structure, **wherein the horizontal-direction is in a non-parallel relationship with a signal amplification direction**.

Therefore, applicant respectfully submits that Ono fails to anticipate the "semiconductor optical amplifier for generating a laser oscillation in a horizontal direction and amplifying a light input to the semiconductor optical amplifier in a length direction, **wherein the length direction is in a non-parallel relationship with the horizontal direction**," as recited in claim 1.

Moreover, applicant believes that the present semiconductor optical device is patentable, as the device integrates a semiconductor optical amplifier and optical detectors 220-1 and 220-2 on a single substrate 201. Such integrated semiconductor optical device is capable of detecting intensity of each signal at an input terminal and output terminal of an amplifier **without using a separate optical divider**.

Applicant respectfully submits that such optical device is not disclosed in Ono. Ono, instead, discloses an optical device containing an optical divider that divides a portion of the input and output optical signals of the optical amplifier. Therefore, Ono, contrary to the present semiconductor optical device, uses a separated optical divider.

For all foregoing reasons, applicant believes that the semiconductor optical device recited in claim 1 is patentable over Ono. As such, applicant respectfully requests withdrawal of the rejection on claim 1.

The newly added claim 21 recites a semiconductor optical device, where the lasing horizontal-direction is **perpendicular** to the signal amplification direction. Applicant respectfully submits that the device recited in claim 21 is patentable over Ono.

Ono, however, does not disclose whether the lasing direction and the optical signal amplification direction of its apparatus is perpendicular to one another. Therefore, Ono fails to

disclose all features of claim 1 and fails to anticipate claim 1.

Other dependent claims in this application, including the newly added claims, are each dependent on the independent claim 1 and believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual consideration of the patentability of each on its own merits is respectfully requested.

Should the Examiner deem that there are any issues which may be best resolved by telephone, please contact Applicant's undersigned representative at the number listed below.

Respectfully submitted,

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